

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

Claims 1-16 canceled.

17. (New) An apparatus for producing a multi-pulse sequence for irradiating a substance provided with quadrupole nuclei to detect an NQR signal emitted therefrom, the apparatus comprising:

pulse sequence generating means adapted to produce a combination of two or more steady state free precession pulse sequences, arranged so that a definite regularity of the phase alteration of pulses in each of the pulse sequences occurs that is equivalent to a shift of spectral components of the pulse sequences in relation to each other, and that in at least one of the pulse sequences, there are not less than two phases alternating.

18. (New) An apparatus as claimed in claim 17, wherein at least one of the SSFP pulse sequences contains a preparatory pulse.

19. (New) An apparatus as claimed in claim 17, wherein none of the SSFP pulse sequences contains a preparatory pulse.

20. (New) A method for detecting a class of substance containing quadrupole nuclei in a sample using nuclear quadrupole resonance, including the following steps:

generating a combination of the steady state free precession pulse sequences, the pulse sequences consisting of pulses that contain phases of the carrier frequency chosen from a certain set of unmatched phases distributed within the interval from 0 to 2π radian, with every sequence different from the others either by the number of phases chosen from the set, or by the unmatched phase order inside the sequence; and

irradiating the sample with said combination of the pulse sequences.

21. (New) A method as claimed in claim 20, including alternating not less than two unmatched phases in at least one of the pulse sequences.
22. (New) A method as claimed in claim 20, including generating a combination of the SSFP pulse sequences, wherein at least one of the said SSFP sequences has a preparatory pulse
23. (New) A method as claimed in claim 21, including switching on said preparatory pulse before one or several of the pulse sequences of the combination.
24. (New) A method as claimed in claim 20, including detecting nuclear quadrupole resonance signals when the combination of the pulse sequences irradiates the sample; and combining all said nuclear quadrupole resonance signals to generate the resulting signal.
25. (New) A method as claimed in claim 20, wherein the predetermined frequency of the pulse sequence is near to one of the NQR frequencies of the substances to be detected.
26. (New) A method as claimed in claim 20, including generating the combination of the steady state free precession pulse sequences without a preparatory pulse.
27. (New) A method for detecting a class of substance containing quadrupole nuclei in a sample using nuclear quadrupole resonance, including irradiating the sample using a combination of radio frequency steady state free precession pulse sequences comprising at least two multi-pulse sequences having the same carrier frequency, but different phase shifts between the pulses, in each sequence of the combination.
28. (New) A multi-pulse sequence for irradiating a substance provided with quadrupole nuclei to detect an NQR signal emitted therefrom, comprising a combination of two or more steady state free precession pulse sequences, arranged so that a definite regularity of the phase alteration of pulses in each of the pulse sequences is equivalent to a shift of spectral components of the pulse sequences in relation to each other, and in at least one of the pulse sequences, not less than two phases are alternating.

29. (New) A multi-pulse sequence as claimed in claim 28, wherein at least one of the pulse sequences contains a preparatory pulse.

30. (New) A multi-pulse sequence as claimed in claim 28, wherein the combination of two or more pulse sequences is different from a combination of PAPS and NPAPS, and none of the pulse sequences contains a preparatory pulse.

31. (New) An apparatus for producing a multi-pulse sequence for irradiating a substance provided with quadrupole nuclei to detect an NQR signal emitted therefrom, the apparatus comprising:

means for producing a combination of two or more steady state free precession pulse sequences, arranged so that a definite regularity of the phase alteration of pulses in each of the pulse sequences occurs that is equivalent to a shift of spectral components of the pulse sequences in relation to each other, and that in at least one of the pulse sequences, there are not less than two phases alternating.